CellPress

Seeking Questions Over Answers

Hallowed conventions support rich meaningful discourse. In popular journalism, the editorial article, for instance, conventionally must provide a "bottom line" that catalyzes discussion and debate. In research, top studies in the life sciences are justly prized for what they provide in terms of biological insight, molecular mechanism, and conceptual novelty. But when is it time to develop new conventions to foster new modes of discourse?

This month, inspired by this issue's articles and the inaugural Solve conference (solve.mit.edu), we break with convention and pose problems rather than solutions centered on three topics that have been top of mind. We hope this shift will ultimately lead our readers to articulate new questions and identify unforeseen solutions.

Humans, the New "Model Organism"

Three articles in this issue showcase that humans could be the major experimental organism in biological research. Many within the research community recognize the promise of population studies on exceptionally large cohorts of people, with the aim of better understanding the human body in health and disease. This approach is exemplified by Michael Inouye and colleagues (pp. 293–301), who use multi-omic data and health records from >10,000 individuals to elucidate the biological processes underlying a blood biomarker called GlycA.

In addition, Atul Butte reminds us that we need to think beyond molecular-level data and consider the effects of behavior, the environment, and other non-genomic factors on human physiology and disease (Q&A, pp. 254–255). This broader view provides the context that's necessary if we are to understand which parts of biology are medically important. This, in turn, may provide the personalized medicine of the future. For example, Neema Jamshidi and colleagues use a metabolic model that is "personalized" based on data from metabolite profiling of human blood samples to predict mechanisms underlying drug responses (pp. 283–292).

Together, these articles highlight the tremendous promise of high-resolution, multi-dimensional profiling of human physiology and the aggregation of these data across many individuals to enable the regular study of human biology directly.

What advances would help realize the promise of large human cohorts for research?

The Enduring Value of Curated Insights

Data and analytics, it's been said, are the new game in town. For instance, with the ever-growing capabilities of technologies to measure the previously unmeasurable and to monitor health continuously over time, it is tempting to believe that machines will solve medicine's problems by crunching these data.

Yet it is impossible to ignore our collective appetite for human-curated insight that we can trust. Human curation is powering new music discovery features on streaming music platforms. Curated email newsletters are all the rage (https://tinyletter.com/edyong209, http://ben-evans.com/#newsletter, http://www.lennyletter.com/). Moreover, in systems biology, we also know that measurements alone are not enough. Without knowledge and insight, vast amounts of data may result in "garbage-in-garbage-out" writ large.

What strategies and tools best allow the strengths of human insight to be effectively augmented using data, computation, theory, and quantitative measurement?

Practical Solutions Deployed for Large Impact

This month we had the privilege of attending the inaugural Solve conference (solve.mit.edu). Although bold, inspiring new ideas were in abundance, a theme evident across the four pillars of the conference (Cure, Fuel, Make, and Learn) was the challenge of making the best use of what we already have. For example, Anthony Fauci, head of the National Institute of Allergy and Infectious Diseases, noted that many infectious diseases can be controlled, and so solving challenges related to the implementation and delivery of these control measures, especially in developing countries, is worth elevating side-by-side with new technological solutions such as an HIV vaccine.

A major challenge here is cultural. The solutions to implementation problems are often modest and appear obvious in retrospect. This make them easy to overlook, despite the insight and creativity they require and their clear real-world impact.

What implementation challenges, if overcome, would enable the greatest progress in the life sciences? What can be done so that implementation and delivery research receives greater recognition?

#SeekQuestions

These questions represent a sampling of what we've been thinking about this month. What questions are you pursuing or wish were pursued more vigorously? Continue the dialog with @CellSystemsCP on Twitter #SeekQuestions, comment at the online version of this article, or email us at systems@cell.com. We hope to share select responses in future issues of *Cell Systems*.

—The *Cell Systems* editorial team

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